

WHAT IS CLAIMED IS:

1. A data modulation method comprising the steps of:  
encoding a transmission data to data symbol;  
inserting the reference symbol in which multiple  
synchronizing patterns are aligned in time series in order to  
contain the structure of  
IA-A-IA-A-A-IA-A-IA-IA  
(where: IA is the phase-shifted synchronizing pattern A)  
into said data symbol; and  
modulating the data symbol in which said reference symbol  
is inserted to radio frequency signals.
2. The data modulation method according to claim 1 wherein  
said step of modulating the data symbol comprises conducting the  
modulation according to the orthogonal frequency division  
multiplexing (OFDM) system.
3. A data modulation method comprising the steps of:  
encoding a transmission data to data symbol;  
inserting the reference symbol in which multiple  
synchronizing patterns are aligned in time series to contain the  
structure of  
A-IA-A-IA-IA-A-IA-A-A  
(where: IA is the phase-shifted synchronizing pattern)  
into said data symbol; and

modulating the data symbol in which said reference symbol is inserted to radio frequency signals.

4. The data modulation method according to claim 3 wherein said step of modulating the data symbol comprises conducting the modulation according to the orthogonal frequency division multiplexing (OFDM) system.

5. A data modulation method comprising the steps of:  
encoding the transmission data to data symbol;  
inserting the reference symbol in which multiple synchronizing patterns are aligned in time series in order to contain the structure of

IB-IB-IB-IB-B-B-B-B-IB

(where: IB is the phase-shifted synchronizing pattern B)  
into said data symbol; and

modulating the data symbol in which said reference symbol is inserted to radio frequency signals.

6. The data modulation method according to claim 5 wherein said step of modulating the data symbol comprises conducting the modulation according to the orthogonal frequency division multiplexing (OFDM) system.

7. A data modulation method comprising the steps of:

encoding the transmission data to data symbol;  
inserting the reference symbol in which multiple  
synchronizing patterns are aligned in time series in order to  
contain the structure of

B-B-B-B-IB-IB-IB-IB-B

(where: IB is phase-shifted sync pattern B)  
into said data symbol; and

modulating the data symbol in which said reference symbol  
is inserted to radio frequency signals.

8. The data modulation method according to claim 7 wherein  
said step of modulating the data symbol comprises conducting the  
modulation according to the orthogonal frequency division  
multiplexing (OFDM) system.

9. A data modulation device comprising:

encoding means for encoding the transmission data to data  
symbol;

reference symbol insertion means for inserting the  
reference symbol in which multiple synchronizing patterns are  
aligned in order to contain the structure of

IA-A-IA-A-A-IA-A-IA-IA

(where, IA is phase-shifted synchronizing pattern A)  
into said data symbol; and

modulation means for modulating the data symbol in which

said reference symbol is inserted to wireless frequency signal.

10. A data modulation device comprising:

encoding means for encoding the transmission data to data symbol;

reference symbol insertion means for inserting the reference symbol in which multiple synchronizing patterns are aligned in time series in order to contain the structure of

IB-IB-IB-IB-B-B-B-IB

(where, IB is the phase shifted synchronizing pattern B) into said data symbol; and

modulation means for modulating the data symbol in which said reference symbol is inserted.

11. A communication device comprising:

encoding means for encoding the transmission data to data symbol;

reference symbol insertion means for inserting the reference symbol in which multiple synchronizing patterns are aligned in time series in order to contain the structure of

IA-A-IA-A-A-IA-A-IA-IA

(where, IA is the phase shifted sync pattern A) into said data symbol;

modulation means for modulating the data symbol in which said reference symbol is inserted to radio frequency signal;

an antenna for receiving/transmitting the modulated signal;  
and

synchronization detection means for obtaining the correlation value between the reference symbol of the signal received and the delayed reference symbol and detecting the synchronization.

12. A communication device comprising:

encoding means for encoding the transmission data to data symbol;

reference symbol insertion means for inserting the reference symbol in which multiple sync patterns are aligned in time series in order to include the structure of

IB-IB-IB-IB-B-B-B-IB

(where, IB is the phase shifted sync pattern B)

modulation means for modulating the data symbol in which said reference symbol is inserted to radio frequency signal;

an antenna for receiving/transmitting the modulated signal;  
and

synchronization detection means for obtaining the correlation value between the reference symbol of signal received and the reference symbol delayed and detecting synchronization.